
CHAPTER 13: RESTORATION

"The secret of getting started is breaking your complex overwhelming tasks into manageable tasks, and then starting on the first one."

Mark Twain

RESTORING OUR WATERSHEDS

Recovering CCC coho salmon populations will require addressing multiple factors leading to their decline. One of the leading causes resulting in the decline of CCC coho salmon is habitat degradation. Habitat degradation has diminished population carrying capacities and reduced their likelihood of survival in most watersheds across the range of CCC coho salmon. Addressing degraded habitats can take two approaches: (1) abating threats and allowing habitats to recover at natural rates or (2) abating threats and accelerating the recovery of degraded habitats through active restoration and enhancement actions. Due to the status of CCC coho salmon, active restoration and enhancement actions are essential to ensure the survival of this species. Recovery will require a systematic and sustained watershed by watershed approach to rehabilitate impaired habitats and degraded watershed processes. Recovery actions recommend implementation of general and site-specific restoration strategies, on a watershed by watershed basis.

Recommended restoration and enhancement actions take a two pronged approach: returning habitats to properly functioning condition, and in some cases creating entirely new habitat. Examples of actions that restore habitats to proper function include: replanting riparian areas; creating riparian buffers; excluding livestock from instream and riparian areas; installing large wood or other instream habitat features; treating sediment sources and decommissioning unpaved roads; improving water diversion practices; and providing off-channel habitats. Creating new habitat involves building and maintaining artificial structures, and utilizing best management practices to reduce the negative effects of urban development, agriculture, water diversion, and other land use impacts. The majority of actions recommended in this recovery plan focus on returning habitats to properly functioning conditions rather than creating new habitats.

PRIORITIZING RESTORATION ACTIONS

CCC coho salmon habitat quality currently diverges significantly from historical conditions. This divergence, along with a recent shift in marine conditions that has lowered marine survival, has led to the extreme decline in CCC coho salmon abundance across the ESU. CCC coho salmon populations are so low that simply improving one element of habitat condition or access to additional habitat will not halt their decline. Prioritization is necessary to emphasize restoration techniques which are sufficient to ensure the existence of CCC coho salmon into the future. For

example, retrofitting a problem culvert can improve passage upstream, but unless habitat exists that allows completion of all life stages there will not be an increase in the population. In this recovery plan, restoration actions are emphasized which directly improve survival, increase carrying capacity, and ultimately improve population numbers.

In Chapter 10, subwatersheds (also called planning watersheds) for all twenty-eight focus populations were ranked based on current occupancy patterns and the importance of these subwatersheds for short-term and long-term coho salmon survival. Ranking is an attempt to prioritize limited restoration monies and expertise, and to guide practitioners and land managers towards projects for immediate and long-lasting habitat improvement. Specific actions recommended for each subwatershed will vary based on assessment information, and the status of watershed conditions and land use development. The immediate priority of this recovery plan is to improve habitat, or access to habitats, in subwatersheds where coho salmon still persist (*i.e.*, core habitat areas). Once restoration of “Core areas” is accomplished, the next priority is to restore subwatersheds with generally suitable habitat conditions that are currently unoccupied, or nearly so (*i.e.*, Phase I areas). Finally, as a long-term goal, the plan recommends restoring unoccupied watersheds (*i.e.*, Phase II areas), which can be utilized in the future by expanding coho salmon populations once conditions improve. The three ranks, the rationale behind their definitions, and the strategy for restoration and subsequent monitoring are described below:

- Core Areas

Core Areas are subwatersheds believed to maintain at least one coho salmon lineage. The goal of restoration in Core Areas is to improve and protect occupied habitats as soon as possible to ensure survival and long-term persistence. Project types will likely include (a) protecting intact habitat through regulatory actions, conservation easements, and other means; (b) installing large woody debris for cover and stream scour (leading to pool formation); (c) creating/providing additional access to off channel over-wintering habitat for juveniles; (d) controlling sediment input from roads; and (e) addressing instream flows. High-cost intensive efforts are appropriate in these areas. Watershed assessments to focus restoration actions, water quality monitoring, and fish population trend monitoring are necessary to provide feedback on the effectiveness of restoration actions.

- Phase I Areas

Phase I areas are watersheds adjacent to, or near, Core Areas that (a) recently supported coho salmon populations; (b) currently support coho salmon in low numbers relative to other occupied subwatersheds; (c) maintain most of the instream habitat conditions necessary for successful completion of all freshwater life stages; and/or (d) may receive strays from Core Areas. Due to their proximity to many Core Areas, Phase I areas are likely to provide seasonal refuge when habitat in Phase II areas is inhabitable. The goal of restoration activities in these watersheds is to improve habitat for populations of coho salmon expanding from Core Areas. Careful analysis of limiting factors and connectivity of project sites is needed to ensure restoration activities address the highest priority limiting factors in the correct sequence. Project types will likely include (a) improving

habitat and channel complexity; (b) removing barriers to suitable habitat; (c) controlling sediment input from roads; and (c) improving riparian corridors. In addition to presence/absence monitoring of habitat usage by coho salmon, monitoring water and habitat quality and quantity is also important to track restoration success, in space and time, within Phase I areas.

- Phase II Areas

Phase II areas are subwatersheds are unlikely to receive appreciable numbers of strays or to support small populations in the immediate future. These subwatersheds often have habitats highly divergent from historical conditions. Phase II areas are essential for long-term recovery goals, but they need large-scale and sustained long-term restoration efforts. It will likely take many decades to restore habitat conditions in some Phase II areas. Priority project types include improving passage upstream to Core and Phase I areas, remediating degraded watershed processes that affect downstream Core and Phase I areas, protecting riparian areas to aid natural re-vegetation, inserting instream structure to remediate homogenous habitats, and gradually changing or improving land management practices to restore natural watershed processes.

RESTORATION PLANNING

Successful restoration projects require an understanding of channel processes and local limiting factors for coho salmon. Restoration must take into account the relative influence and spatial scales of channel processes and biological constraints at the project site. Projects should be based on the best available science and the biological constraints of coho salmon. Labor-intensive projects must be built to appropriate specifications and have appropriate funding commitments to ensure they are adequately maintained. Monitoring must reflect the goals and scale of the project. Monitoring and evaluation do not usually affect the success of individual projects, but they improve the design of future projects and are an important component of a restoration strategy.

Early coordination is essential for timely approval and execution of restoration projects, particularly when many stakeholders are involved. Considerable support is available to those willing to undertake restoration projects. Local, state, and Federal agencies provide technical assistance, cost share, and grant funding for design, implementation, and monitoring. Numerous non-governmental organizations provide similar services and also offer project management, liability coverage, and environmental compliance coordination and support. These services are typically provided at no or low cost to the landowner or project proponent. Private consulting firms also provide technical assistance, project management, environmental compliance, monitoring, as well as engineering and other services necessary for successful project implementation.

The availability of in-kind services and grant funding depends on:

- Location: most programs serve a limited geographic area;
- Land ownership and use: some programs serve only private, public, agricultural or urban lands;

-
- Importance or priority of the project;
 - The identification of a project in a stream inventory, watershed plan, or within a local/state/federal management plan;
 - Ecosystem type: some programs focus on streams, wetlands, estuaries or uplands; and
 - Cost share, commitment or participation by private landowners or a local sponsor.

Permitting and project management can be considerable obstacles to landowners, individuals, and small groups wishing to carry out restoration projects. Permit waivers or programmatic permits can reduce costs and streamline the regulatory process by providing umbrellas for local/state or federal consultation. However, the availability of permit waivers or programmatic permits depends on a project's type and location, and additional work by public agencies is often needed to facilitate projects and remove regulatory obstacles. Further permit streamlining will be necessary to provide incentives to landowners and managers wanting to implement restoration and enhancement projects.

Opportunities and Challenges for Restoration Projects

Many projects use well-understood and documented techniques that have been consistently demonstrated to benefit coho salmon and their habitats. Examples include: removing barriers; installing woody debris; and establishing riparian buffers.

High priority projects which may lead to long term restoration of functional stream processes, but that are not as well understood, require more research, monitoring, and long-term evaluation of their success. These include:

- Reconnecting incised channels with their floodplains;
- Reconnecting wetlands and re-creating off channel habitat, especially in developed areas where channel stability is questionable or flooding is a concern; and
- Providing safe passage for adults and smolts through urbanized areas with channelized streams and inadequate flows.

Other high priority projects need regulatory solutions to reduce costs, time and risk to private landowners and public entities to be more widely utilized:

- Off channel water storage during winter, with the goal of reducing dependency on summer riparian rights (without increasing total annual water withdrawals);
- Addition of secured and engineered large woody debris projects upstream of culverts, bridges and urban infrastructure; and
- Actions to improve degraded lagoons and estuaries where flooding is a concern or conflicts with other listed/protected species occur.

Because many of the actions outlined in this recovery plan will be carried out on a voluntary basis, public support is important. NMFS believes public participation and a stewardship role, led by private land owners and public land managers, is essential to the survival and long-term recovery of CCC coho salmon, particularly in light of the significant amount of private land ownership within the range of this species. Conducting outreach and assisting interested and

affected parties in becoming partners in restoration and recovery is critical to success. Stakeholders in restoration projects include:

- ❑ Landowners who wish to carry out restoration activities on their own property, either alone or in cooperation with agencies and NGOs. Project management and grant funding is available to help landowners carry out projects at no or low cost to themselves;
- ❑ Resource Conservation Districts and NGOs. These organization often work as a bridge between government agencies and private landowners to assuage fears regarding regulations, and also work to encourage landowners to implement recovery actions;
- ❑ Members of the public who do not own land suitable for restoration can make significant contributions by volunteering and participating in restoration, monitoring, and planning efforts; and
- ❑ Clubs, social organizations, and other organized groups can assist in restoration by providing volunteer labor for projects, conducting outreach within their communities, and coordinating and contacting regulatory agencies.

RESTORATION PARTNERS

The following is a partial list of organizations that can assist in restoration design and implementation. Additional resources are available in most areas from watershed groups, alliances, or other NGOs. Occasional funding may be available from agencies in the form of mitigation or disbursements from environmental fines.

The Pacific Coast Salmon Recovery Fund

Congress established the Pacific Coast Salmon Recovery Fund (PCSRF) to contribute to restoration and conservation of Pacific salmon and steelhead populations and their habitats. The states of Washington, Oregon, California, Idaho, and Alaska, and Pacific Coastal and Columbia River tribes, receive PCSRF appropriations from NMFS each year. The fund supplements existing state, tribal and local programs to foster development of Federal-state-tribal-local partnerships in salmon and steelhead recovery and conservation. The PCSRF supports grant programs that directly fund recovery actions, such as: (a) instream habitat improvement; (b) watershed evaluations; (c) assessment, planning and project design; (d) education and outreach; (e) watershed organizational support and assistance; (f) public involvement and capacity building; (g) private sector training and education; (h) monitoring of salmonid populations and restoration projects; (i) cooperative rearing; project maintenance; fish screening of diversions; tailwater management; water conservation measures; water measuring devices; and water purchase and lease.

It is imperative PCSRF funds are granted consistent with recovery planning goals and be creative in funding a wide variety of actions promoting recovery. Projects should be based on the strongest scientific foundation and should include monitoring and maintenance to inform future recovery efforts.

The NOAA Restoration Center

The NOAA Restoration Center provides funding and technical assistance to restoration projects benefiting NOAA trust resources, including salmon and steelhead. Since 1996, the NOAA Restoration Center has funded over 300 projects benefiting California salmon and steelhead. The Restoration Center works with NMFS staff to develop and implement projects addressing limiting factors to salmonid recovery; partners with grassroots organizations to encourage hands-on citizen participation, and delivers technical support to help ensure project success.

NMFS PRD will work with the Restoration Center to coordinate recovery efforts for CCC coho salmon. PRD and the Restoration Center, in combination with other funding programs, will facilitate funding, permit streamlining, technical assistance, and outreach to the restoration community. The Restoration Center will bring its funding and restoration partners into the recovery process, while also networking to find new recovery partners and determining who is best suited to take on specific recovery actions. The Restoration Center's goal to fund community-based habitat restoration and provide technical restoration assistance directly complements the goals of the recovery plan for CCC coho salmon.

NMFS Science Centers

NMFS PRD will coordinate with the NMFS' Southwest Fisheries Science Centers to identify and address research needs regarding coho salmon recovery. They will also coordinate on captive broodstock conservation programs to ensure that outplantings and restoration activities compliment each other.

State & Local Governmental Agencies

CCC coho salmon are listed as endangered by the State of California. NMFS will coordinate with state agencies on planning, research, monitoring, and carrying out projects and programs. These agencies include: DFG; CalFire; California Coastal Conservancy; University of California Cooperative Extension; California Conservation Corps; Resource Conservation Districts; the State Water Resources Control Board; local flood control districts; water agencies; and city and county governments.

Non-Governmental Organizations

Numerous non-profits, volunteer groups, professional organizations, and quasi-governmental organizations are engaged in ecological restoration. Where their focus intersects with NMFS recovery goals, NMFS will coordinate with them to facilitate planning, research, monitoring, and project implementation.

RESTORATION ASSISTANCE

Federal programs that provide information, funding and/or technical assistance:

- ❑ NMFS, Southwest Region swr.nmfs.noaa.gov

-
- NOAA Restoration Center nmfs.noaa.gov/habitat/restoration/
 - USFWS Partners for Fish and Wildlife fws.gov/partners/ and Coastal Programs fws.gov/coastal/CoastalProgram
 - US EPA epa.gov
 - NRCS nrcs.usda.gov
 - USACE <http://www.usace.army.mil/missions/environment.html>

State programs that provide information, funding and/or technical assistance:

- California Department of Fish and Game www.dfg.ca.gov/fish/
- California Coastal Conservancy www.scc.ca.gov
- State Water Resources Control Board www.swrcb.ca.gov
- California Conservation Corps www.ccc.ca.gov/
- University of California Cooperative Extension <http://ucanr.org/index.cfm>

Local and regional programs that provide information, funding and/or technical assistance:

- CalFish www.calfish.org
- Coastal Watershed Planning and Assessment Program (CWPAP) <http://coastalwatersheds.ca.gov/Home/tabid/54/Default.aspx>
- Resource Conservation Districts www.carcd.org
 - Santa Cruz Resource Conservation District <http://www.rcdsantacruz.org/>
 - San Mateo County Resource Conservation District <http://www.sanmateorcd.org/>
 - Gold Ridge Resource Conservation District <http://www.goldridgercd.org/>
 - Sotoyome Resource Conservation District <http://sotoyomercd.org/>
 - Marin Resource Conservation District <http://www.marinrcd.org/>
 - Southern Sonoma Resource Conservation District <http://www.sscrcd.org/>
 - Mendocino County Resource Conservation District <http://www.mercd.org/>
 - And others
- City and County Governments
- Five Counties Salmonid Conservation Program www.5counties.org
- Fishnet 4C <http://fishnet.marin.org>
- The Fish Passage Forum <http://www.calfish.org/ProgramsandProjects/FishPassageForum/tabid/127/Default.aspx>
- Klamath Resource Information System (KRIS) <http://www.krisweb.com/>
- Salmonid Restoration Federation <http://www.calsalmon.org/>

-
- Trout Unlimited <http://www.tu.org/>
 - California Trout <http://www.caltrout.org/>
 - And others